

REMARKS

Claims 1-74 and 78 are now pending in this application, with Claims 46-74 having been withdrawn from consideration. Claims 1-3, 5-8, 10-23, 25-33, 35-38, and 40-45 have been amended to define more clearly what Applicant regards as his invention; these changes are made for the purposes of clarification only. Claim 78 has been added to provide Applicant with a more complete scope of protection. Claims 1, 16, and 31, of the claims currently under consideration, are in independent form. Favorable reconsideration is requested.

Applicant affirms the election of Species I (Claims 1-45).

An Information Disclosure Statement and a corresponding Form PTO-1449 were filed on March 2, 2004, and Applicant respectfully requests the Examiner to return an initialed copy of that Form PTO-1449, indicating the references cited thereon were considered.

Applicants note with appreciation the indication that Claims 5, 6, 12-14, 20, 21, 27-29, 35, 36, and 42-44 would be allowable if rewritten so as not to depend from a rejected claim, and with no change in scope. These claims have not been so rewritten because, for the reasons given below, their base claims are believed to be allowable.

Claims 1-4, 7, 8, 10, 11, 15-19, 22, 23, 25, 26, 30-34, 37, 38, 40, 41, and 45 were rejected under 35 U.S.C. § 103(a) as being obvious from U.S. Patent 6,195,465 to Zandi et al. in view of U.S. Patent 6,668,090 to Joshi et al., as set out at pages 4-6 of the Office Action. Claims 9, 24, and 39 were rejected as being obvious from Zandi in view of Joshi et al., and further in view of U.S. Patent 6,229,927 to Schwartz.

Claim 1 is directed to a method of entropy coding of discrete wavelet transform coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane. Transform coefficients of a code block are pre-analyzed in sign-magnitude form to determine statistical data about the coefficients. The statistical data is stored, and based upon the statistical data, at least one command is generated for at least one sequence for arithmetic encoding, the sequence comprising a plurality of bit and context pairs.

Zandi et al., as understood by Applicant, relates to a compression and decompression system in which a reversible wavelet filter is used to generate coefficients from input data, such as image data. Zandi et al. uses a reversible wavelet filter in a lossless system (or lossy system) in which an embedded codestream is generated from the coefficients produced by the filter. An entropy coder performs entropy coding on the embedded codestream to produce the compressed data stream. (See abstract.) The encoder of Zandi et al. comprises an ordering and modeling mechanism coupled to the reversible wavelet filter to order the plurality of coefficients and binary values within the plurality of coefficients in order to create the embedded codestream (see, for example, column 48, lines 57-64, of that patent).

The Office Action, at page 4, states that Zandi et al. teaches “storing statistical data about said coefficients”, “and based upon said statistical data, generating at least one command for at least one sequence of bit and context pairs for arithmetic encoding” (the Office Action cites column 27, lines 37-40, of that patent). However, Applicant submits that the statistics discussed in Zandi et al. are entirely different from the statistical data recited in Claim 1. In particular, the statistics discussed in Zandi et al. are the states of the

arithmetic coder after coding part or all of a coding unit. In contrast, the statistical data recited in Claim 1 is derived from pre-analysis of the transform coefficients. That is, the statistical data of Claim 1 relates to the transform coefficients prior to arithmetic encoding. On the other hand, in Zandi et al., the statistics arise during or after the operations of the arithmetic encoder.

In addition, Applicants have found nothing in Zandi et al. that would teach or suggest generating, based upon the statistical data, at least one command for at least one sequence for arithmetic encoding, wherein a sequence comprises a plurality of bit and context pairs, as recited in Claim 1.

By virtue of the features of Claim 1, the arithmetic encoder can generate a code word for the sequence in a single clock cycle, as opposed to the prior art case in which m clock cycles are acquired for the arithmetic coding of a sequence comprising m pairs.

Joshi et al., as understood by Applicant, relates to a method for the formation of layers of a compressed bit-stream in a JPEG 2000 encoder in such a manner that the layers correspond to increasing visual quality levels. Joshi et al. further relates to a method for rate-control of one or more compressed digital images having layers which correspond to increasing visual quality levels.

Applicant has found nothing in Joshi et al. that would remedy the deficiencies of Zandi et al. discussed above. Therefore, Applicant submits that any hypothetical combination of Zandi et al. and Joshi et al. (even assuming such combination to be permissible) would not teach or suggest the method of Claim 1.

Applicants have found nothing in Zandi et al. or Joshi et al., either separately or in any permissible combination (if any) that would teach or suggest pre-analyzing transform

coefficients of a code block in sign-magnitude form to determine statistical data about the coefficients, storing the statistical data, and generating, based upon the statistical data, at least one command for at least one sequence for arithmetic encoding, wherein the sequence comprises a plurality of bit and context pairs, as recited in Claim 1.

Accordingly, it is submitted that Claim 1 is clearly allowable over Zandi et al. and Joshi et al., either separately or in any permissible combination (if any).

Independent Claims 16 and 31 are apparatus and computer program product claims, respectively, corresponding to method Claim 1, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

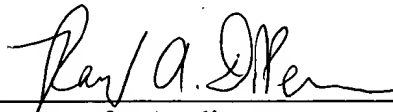
A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Ray A. DiPerna", is written over a horizontal line.

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